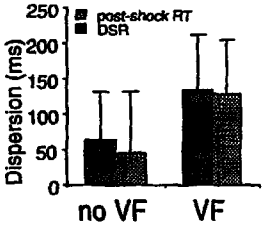
fibrillation (VF) by T wave shocks remains unclear. We investigated the immediate post-shock response by recording 2 monophasic action potentials (MAPs) simultaneously from the right ventricular outflow tract and apex during T wave shock application (2 Joules strength) in 5 patients undergoing testing of an implantable defibrillator. Direct shock repolarization time (DSR), and repolarization time of the first action potential after the shock (post-shock RT) were analyzed in both MAPs. Dispersion was calculated as the difference between the 2 MAP recordings.

Results. Shocks resulting in VF desychronized repolarization to a mean dispersion of 125 ms, while shocks not inducing VF produced significantly less dispersion of repolarization (48 ms; $p < 0.001$) (see Fig). VF inducing shocks were usually (89 percent) those which fell on different repolarization levels of the 2 MAP recordings.



Conclusions. (1) Desynchronization of repolarization appears to be important for VF induction by T wave shocks in patients. (2) Recording of 2 right ventricular MAPs VF may pinpoint the optimal vulnerable window for VF induction by T wave shocks.

1038-14 Induction of Sustained Monomorphic Ventricular Tachycardia After Amiodarone Loading Identifies Patients at High Risk of Sudden Death

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The role of programmed ventricular stimulation (PVS) in patients with documented sustained monomorphic ventricular tachycardia (SMVT) treated with amiodarone remains controversial. In this study, 41 pts (mean age 58 ± 11 yrs) with spontaneous documented SMVT associated with structural heart disease (ischemic in 80%) were studied (PVS, 3 basic pacing rates, up to 3 extrastimuli) after an oral loading dose of 12 to 14 gr. of amiodarone. SMVT was induced in 20 pts (49%). During a mean follow-up of 47 months (range 1 to 134), 28/41 pts (68%) had no arrhythmic event, 7/41 pts (17%) showed SMVT recurrences, and 11/41 pts (27%) died, 8 of them from sudden death (SD). Among all parameters studied (including age, sex, SMVT recurrences, presence of late potentials), the only predictors of SD were: a) inducible SMVT after amiodarone loading (7/8 vs 13/33, $p = 0.02$) and b) a lower left ventricular ejection fraction (26 ± 13% vs 40 ± 14%, $p \pm 0.02$). To predict SD, inducible SMVT after amiodarone loading had a sensitivity of 88%, a specificity of 61%, a positive predictive value of 35% and a negative predictive value of 95%.

Conclusion: induction of SMVT after amiodarone loading identifies a subgroup of pts at high-risk of sudden death.

1039 Stress Echocardiography

Wednesday, March 27, 1996, 3:00 p.m.–5:00 p.m.
Orange County Convention Center, Hall E
Presentation Hour: 3:00 p.m.–4:00 p.m.

1039-53 Clinical Outcome After Normal Exercise Echocardiogram: Follow-up on 1421 Patients

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To determine the outcome of patients (pts) with normal exercise echocardiograms (ExEcho), we followed 1421 pts without known coronary artery disease (CAD) who had normal ExEcho between 1989 and 1994. Cardiac events were defined as cardiac death, nonfatal myocardial infarction (MI), and revascularization [angioplasty (PTCA) or bypass surgery (CABG)]. Indications for ExEcho included evaluation of chest pain or dyspnea (72%), preoperative evaluation (2%), and nondiagnostic exercise ECG (15%). Mean age was 57 ± 13 years, 52% were female. Peak heart rate (HR) and peak rate-pressure product were 155 ± 23 bpm and 28516 ± 5951, respectively. Follow-up was 95% complete; median time 23 months. The cumulative event rate was 0.5% at 1 year, 2.1% at 2 years, and 2.6% at 3 years. There were 30 cardiac events in 23 patients: 2 cardiac deaths, 9 MIs, 10 PTCAs, and 9 CABGs.

Pt characteristics	Event group	No event group
Age > 60 years	83%	46%
History of chest pain	70%	61%
Workload < 7 mets	67%	25%
HR < 85% pred. max.	43%	21%
Angina during ExEcho	22%	5%
Positive exercise ECG	13%	8%

Univariate predictors of time to cardiac event were: age > 60 years, workload < 7 mets, HR < 85% predicted maximum for age, and angina during ExEcho ($p < 0.05$).

Conclusion: In this large group of pts with normal ExEcho the subsequent event rate was low even if symptoms were present. A limited exercise capacity, however, was associated with a higher event rate. This emphasizes the importance of considering the exercise capacity in the interpretation of a normal ExEcho.

1039-54 Prognosis After Normal Dobutamine-Atropine Echocardiograms

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Rationale: No specific data are available on the prognostic value of normal dobutamine-atropine stress echocardiograms (DASE) for late cardiac events.

Methods: 200 patients (pts) with chest pain and normal DASE (normal baseline wall motion, hyperdynamic response to stress) were followed-up for 12 ± 15 months. Mean age was 59 years, 86 (43%) were men. Low (< 10%), intermediate (10–80%) and high (> 80%) pre-test probabilities of coronary artery disease (CAD) were present in 13%, 54% and 33% of the pts, respectively.

Results: 37 pts (19%) had stress-induced angina and 14 (7%) had ischemic ECG changes. During follow-up, 2 pts (1%) suffered cardiac death and 3 pts (1.5%) developed unstable angina with subsequent revascularization (PTCA in 1 and CABG in 2). All pts with an event had high pre-test probabilities of CAD. Pts with cardiac death had maximal stress test and absence of angina or ECG changes during stress. In contrast, out of 7 pts (4%) with pre-test typical angina, submaximal stress test and angina or ECG changes during stress, three developed unstable angina and were revascularized.

Conclusions: Pts with normal DASE have a good prognosis. Cardiac death occurs rarely and cannot be excluded by complete normal DASE without angina or ECG changes. Additionally, pts with high pre-test probabilities of CAD, submaximal normal DASE and angina or ECG changes during stress are still at high risk for unstable angina and subsequent revascularization.

1039-55 A Nonischemic Response During Dobutamine Stress Echocardiography Is Predictive of Good Outcome in Patients With Chronic Left Ventricular Dysfunction

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Sustained improvement in all vascular territories during dobutamine stress echocardiography(DSE) in patients with chronic left ventricular dysfunction differentiates nonischemic from ischemic cardiomyopathy. To determine if the prognosis of a nonischemic response differs from that of an ischemic response, 53 patients with moderate to severe chronic left ventricular dysfunction (EF 30 ± 7%, age 62 ± 13 years, 28 women/25 men, 11 Q-waves on ECG), underwent multi-stage DSE (rest, 5 and 10 mg/kg/min, and peak dose) and were followed for at least one year. Peak heart rate and dose were 126 ± 17 bpm, and 25 ± 10 mg/kg/min, respectively. Atropine was used in 20 patients. Forty-two patients (79%) were identified as having ischemic dysfunction (fixed dysfunction or worsening wall motion from low to peak dose) and 11 (21%) had a nonischemic response (progressive improvement in wall thickening from low to peak dose) in all vascular territories. There were 16 hard cardiac events (12 cardiac deaths and 4 nonfatal myocardial infarctions). Event rates were as follows in the two groups:

	Events
Ischemic Dysfunction	38% (16/42)
Nonischemic	0% (0/11)+

+$p < 0.05$ vs Ischemic Dysfunction

All events occurred in patients with ischemic dysfunction. In conclusion, a nonischemic response is predictive of good outcome in patients with moderate to severe chronic left ventricular dysfunction.